

Inefficiency of Contact

249

a strong one. Of if any other of the contacts in the arrangement can produce a current; why is not that shown by some corresponding effect? The only answers are, to say, that the peculiar iron has the same electromotive properties and relations as platinum, or that the nitrous acid is included under the same law with the metals (797, 823); and so the sum of the effects of all the contacts in the circuit is nought, or an exact balance of forces. That the iron is like the platinum in having no electromotive force at its contacts without chemical action, I believe; but that it is unlike it in its electrical relations, is evident from the difference between the two in strong nitric acid, as well as in weak acid; from their difference in the power of transmitting electric currents to either nitric acid or sulphuret of potassium, which is very great; and also by other differences. That the nitrous acid is, as to the power of its contacts, to be separated from other electrolytes and classed with the metals in what is, with them, only an assumption, is a gratuitous mode of explaining the difficulty, which will come into consideration, with the case of sulphuret of potassium,, hereafter (823, 847, 877, 1048).

833. To the electro-chemical philosopher, the case is only another of the many strong instances, showing that where chemical action is absent in the voltaic circuit, there no current can be formed; and that whether solution of sulphuret of potassium or nitrous acid be the electrolyte or connecting fluid used, still the results are the same, and contact is shown to be inefficacious as an active electromotive condition.

834. I need not say that the introduction of different metals between the iron and platinum at their point of contact, produced no difference in the results (821, 822) and caused no current; and I have said that heat and chemical action applied there produced their corresponding effects. But these parallels in action and non-action show the identity in nature of this circuit (notwithstanding the production on the surface of peculiar iron on that metal), and that with solution of sulphuret of potassium: so that all the conclusions drawn from it apply

here; and if that case ultimately stand firm as a proof against the theory of contact force, this will stand also.
835. I now used oxide of iron and platinum as the extremes of the solid part of the circuit, and the nitrous acid as the fluid;
i.e. I heated the iron wire in the flame of a spirit-lamp, covering it with a coat of oxide in the manner recommended by Schcenbein in his investigations, and then used it instead of